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PROBLEMS.

44. Proposed by O. W. ANTHONY, M. Sc., Professor of Mathematics and Astronomy, New Windsor College, New Windsor, Maryland.

There is a triangle whose sides repulse a center of force within the triangle with an intensity that varies inversely as the distance of the center of force from each point of the sides of the triangle. What is the position of equilibrium of the center?

45. Proposed by H. C. WHITAKER, A. M., Ph. D., Professor of Mathematics, Manual Training School, Philadelphia, Pennsylvania.

A fifty-pound cannon-ball is projected vertically upward with a velocity of 300 feet per second. Find the height to which it will rise and the time of flight, assuming the initial resistance of the air on the ball to be 10 pounds and the resistance to vary as the square of the velocity.



ALGEBRA.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

64. Proposed by G. B. M. ZERR, A. M., Ph. D., Texarkana, Arkansas-Texas.

A man raises 1 chicken the first year; 6, the second; 35, the third; 180, the fourth; 921, the fifth; 4826, the sixth; 23215, the seventh; 116180, the eighth; and so on. How many does he raise the 20th year, and how many in the twenty years?

I. Solution by A. H. HOLMES, Box 963, Brunswick, Maine.

We easily find by inspection $U_{x+1} - 5U_x = \frac{4^{\frac{x+1}{2}} - 1}{3}$, or $\frac{4^{\frac{x+2}{2}} - 1}{3}$, according

as x is odd or even. Integrating and reducing, we have

$$U_x = \frac{1}{4}[5^x + 4 \times 5^{x-2} + 4^2 \times 5^{x-4} + \text{etc.} - \frac{4^{\frac{x+1}{2}} - 1}{3}] \text{ or } \frac{4^{\frac{x+2}{2}} - 1}{3}.$$

$$\text{Summing, } S_x = \frac{1}{4}[5^{x+1} + 4 \times 5^{x-1} + 4^2 \times 5^{x-3} + \text{etc.} - \frac{23 \times 4^{\frac{x+2}{2}} - 12x - 47}{9}],$$

$$\text{or } \frac{11 \times 4^{\frac{x+3}{2}} - 12x - 47}{9}.$$

Putting $x=20$, and performing operations indicated, we have,

$$U_{20} = 28,383,163,779,300, \text{ and } S_{20} = 35,478,954,491,110.$$